FIG 1

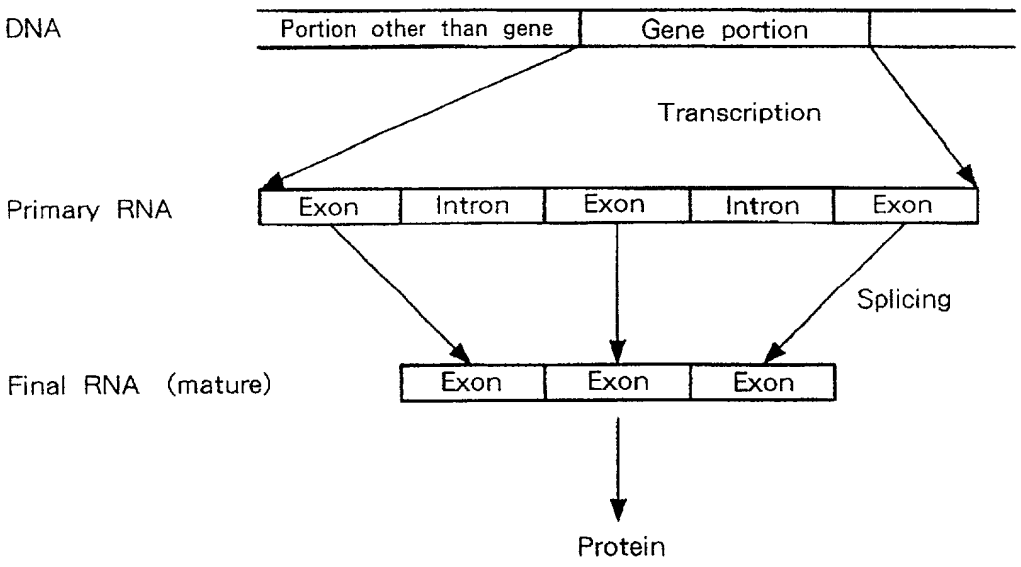
DNA
Portion other than gene
Gene portion
Transcription
Primary RNA
Exon
Intron
Exon
Intron
Exon
Splicing
Final RNA (mature)
Exon
Exon
Exon
Protein

FIG 2

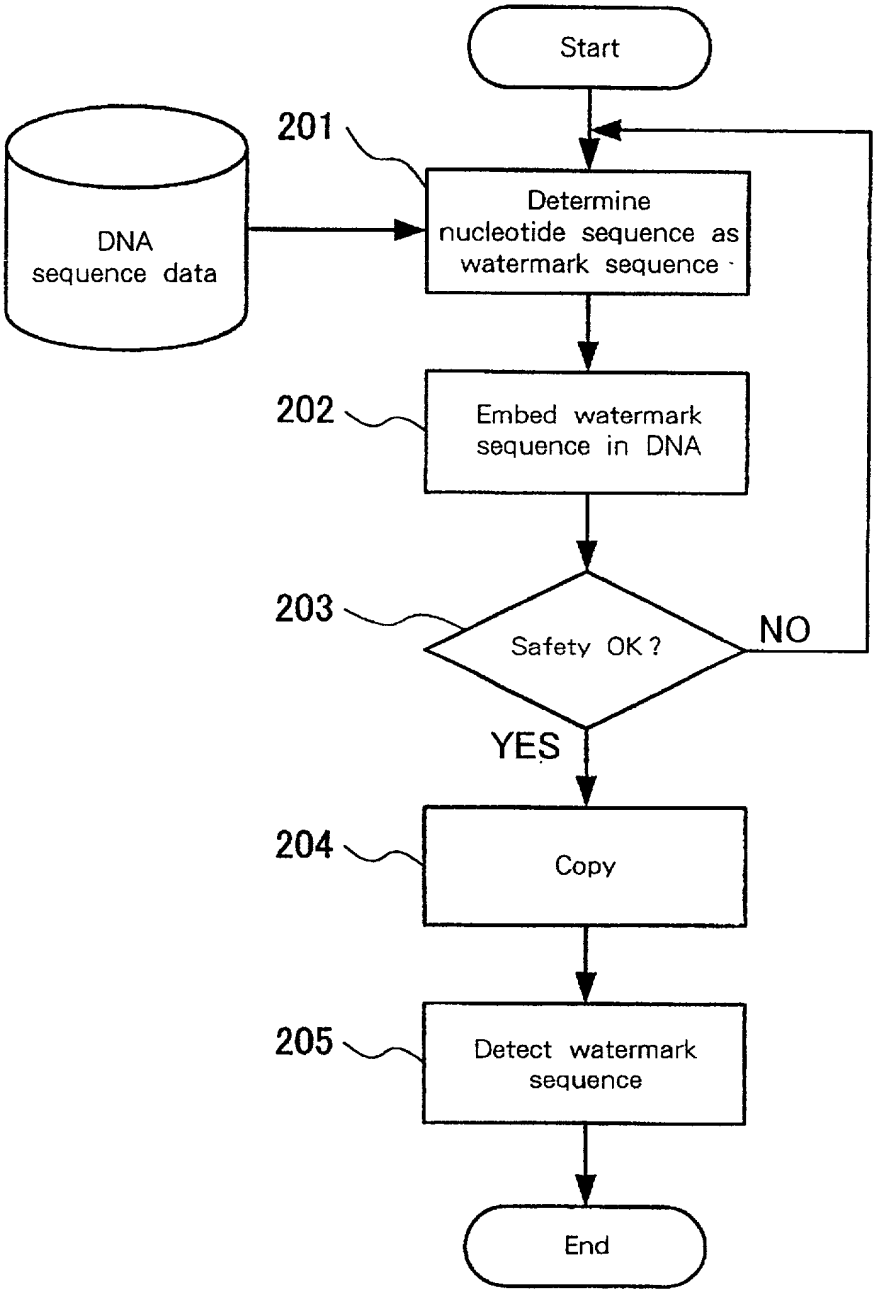
Start
201
DNA sequence data
Determine nucleotide sequence as watermark sequence
202
Embed watermark sequence in DNA
203
Safety OK?
NO
YES
204
Copy
205
Detect watermark sequence
End

FIG 3

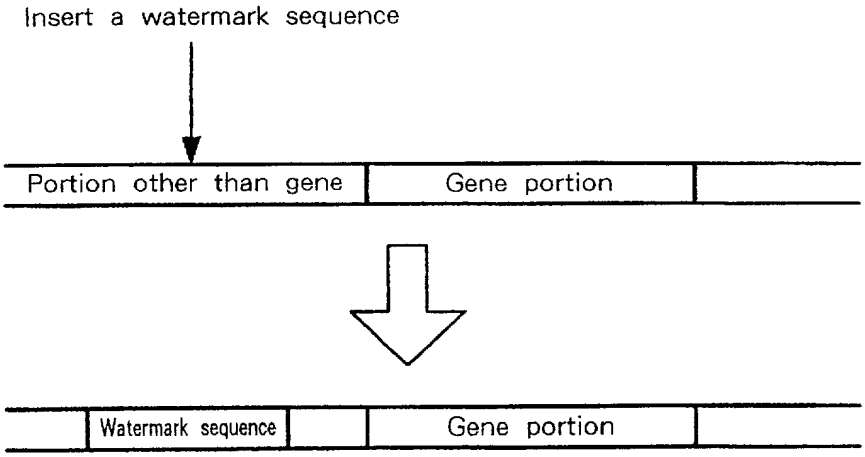
Insert a watermark sequence
Portion other than gene
Gene portion
Watermark sequence
Gene portion

FIG 4

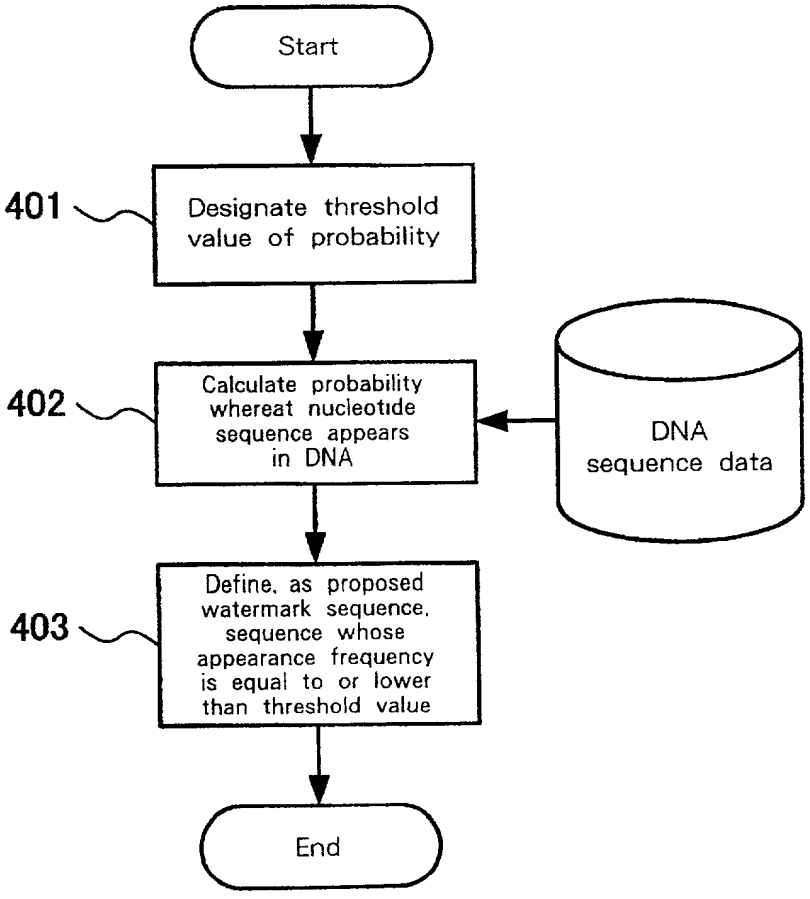
Start
401
Designate threshold value of probability
402
Calculate probability whereat nucleotide sequence appears in DNA
DNA sequence data
403
Define, as proposed watermark sequence, sequence whose appearance frequency is equal to or lower than threshold value
End

FIG 5

Partial sequence having a length of six bases	Appearance frequency in a specific organism
AAAGTT	12
AAAGTG	50
AAAGTC	3
AAAGTA	11
AAAGGT	2
AAAGGG	0
...	...

FIG 6

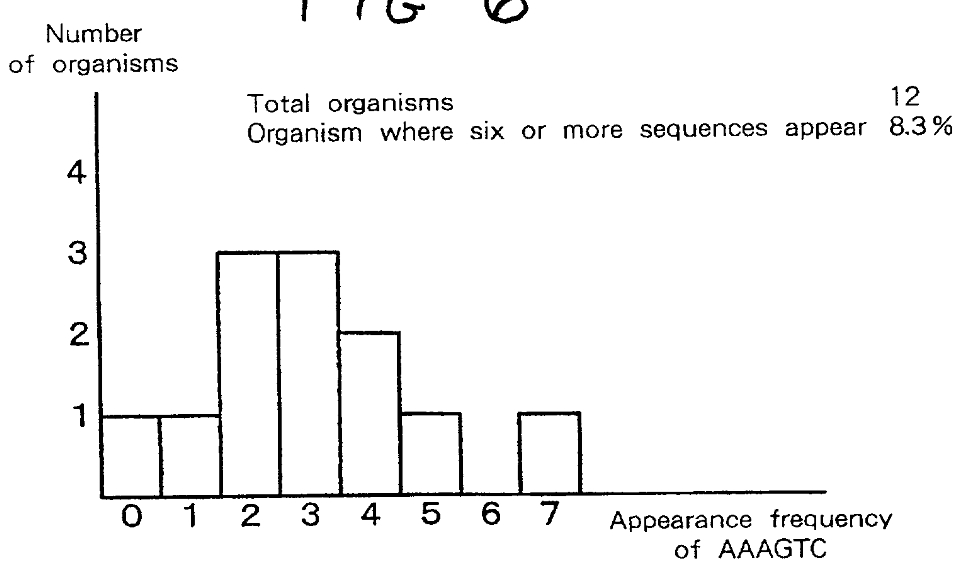

FIG 7

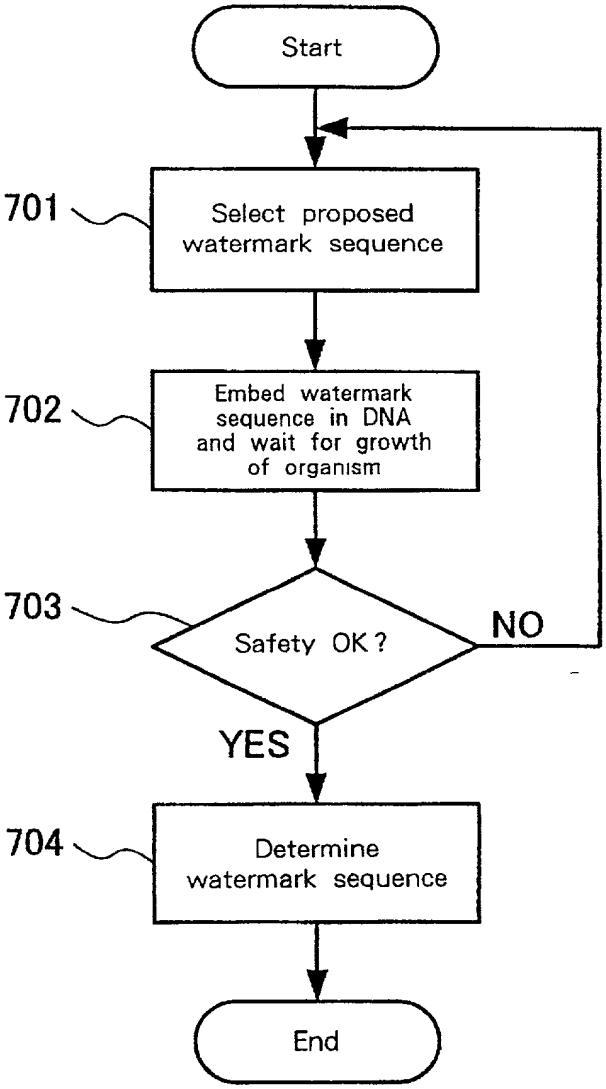
Start
701
Select proposed watermark sequence
702
Embed watermark sequence in DNA and wait for growth of organism
703
Safety OK?
NO
YES
704
Determine watermark sequence
End

FIG 8

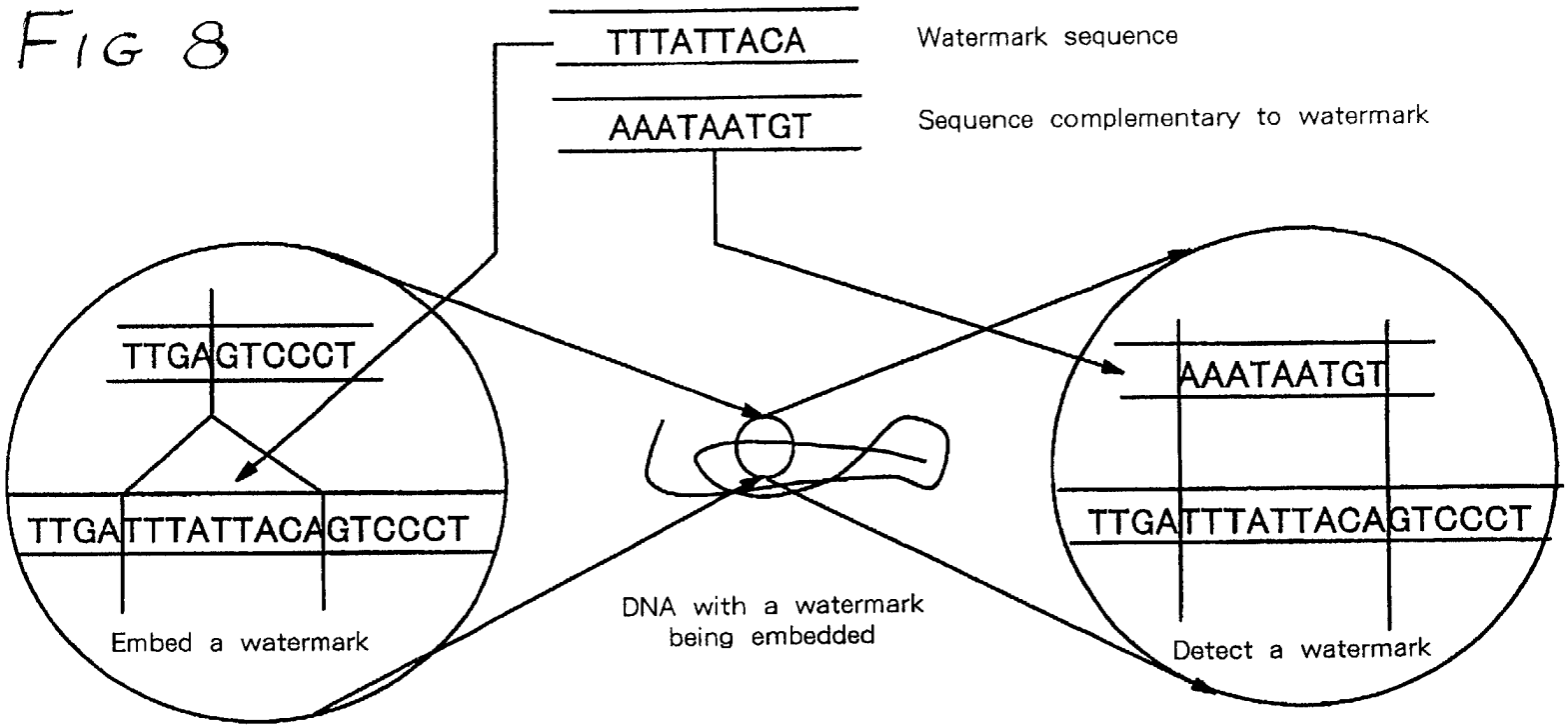
TTTATTACA
Watermark sequence
AAATAATGT
Sequence complementary to watermark
TTGAGTCCCT
TTGATTTATTACAGTCCCT
Embed a watermark
DNA with a watermark
being embedded
AAATAATGT
TTGATTTATTACAGTCCCT
Detect a watermark

FIG 9

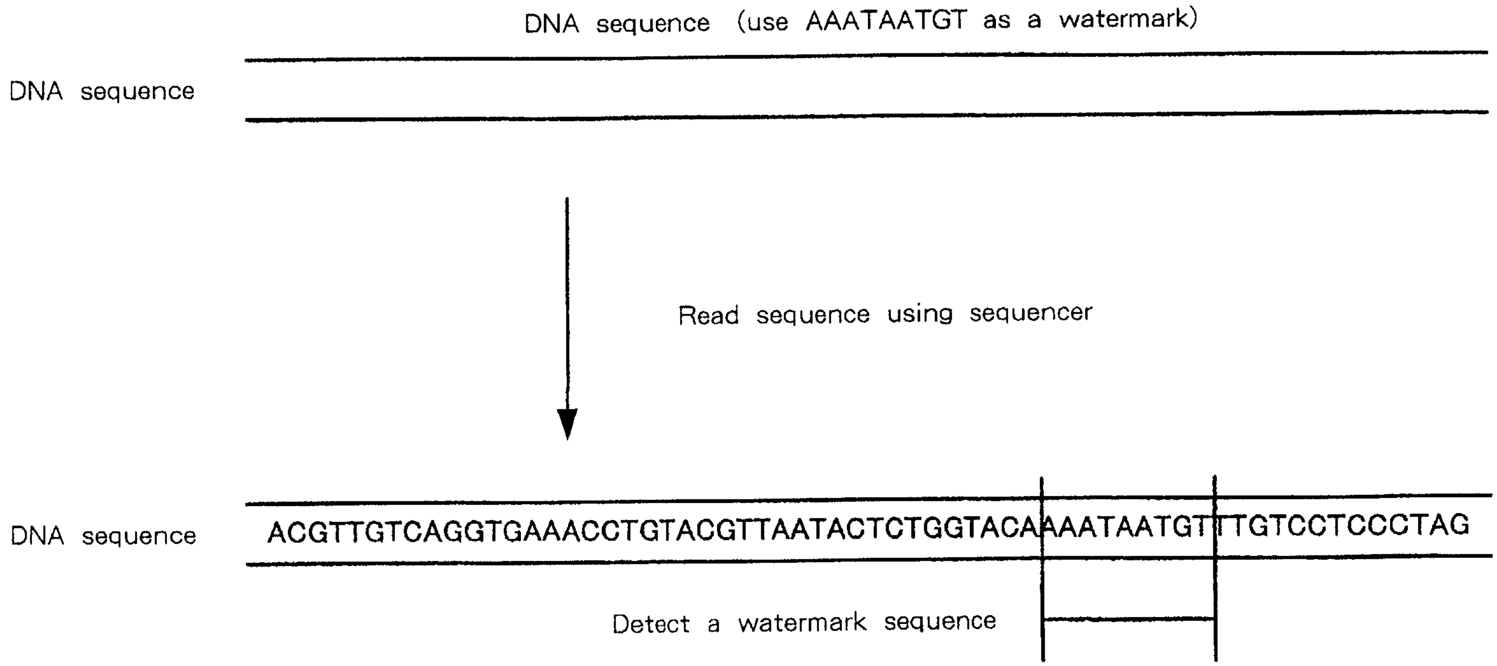
DNA sequence (use AAATAATGT as a watermark)
DNA sequence
Read sequence using sequencer
DNA sequence
ACGTTGTCAGGTGAAACCTGTACGTTAATACTCTGGTACAAAATAATGTTTGTCCTCCCTAG
Detect a watermark sequence

FIG 10

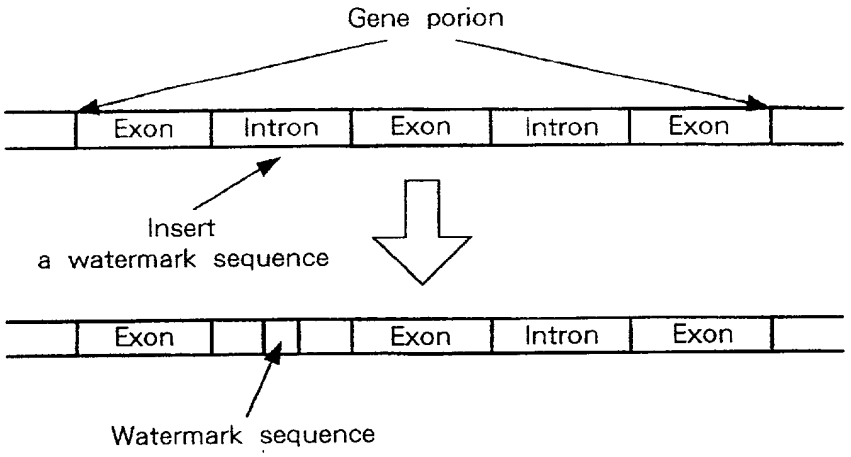
Gene porion
Exon
Intron
Exon
Intron
Exon
Insert
a watermark sequence
Exon
Exon
Intron
Exon
Watermark sequence

FIG 11

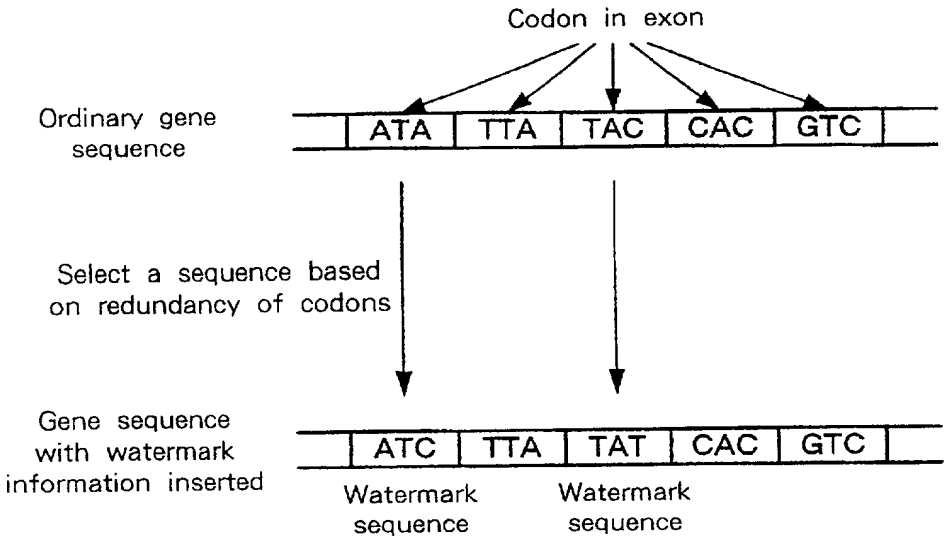
Codon in exon
Ordinary gene sequence
ATA
TTA
TAC
CAC
GTC
Select a sequence based on redundancy of codons
Gene sequence with watermark information inserted
ATC
TTA
TAT
CAC
GTC
Watermark sequence
Watermark sequence

FIG 12

	First embodiment (insert a watermark sequence in a portion other than a gene portion)	Second embodiment (insert a watermark sequence in an intron)	Third embodiment (insert a watermark information using codon redundancy)
Toleration of mating	Yes	Yes	Yes
Toleration of copying of the primary RNA	No	Yes	Yes
Toleration of copying after splicing	No	No	Yes

FIG 13

UUU Phe	UCU Ser	UAU Tyr	UGU Cys
UUC Phe	UCC Ser	UAC Tyr	UGC Cys
UUA Leu	UCA Ser	UAA Termination	UGA Termination
UUG Leu	UCG Ser	UAG Termination	UGG Trp
CUU Leu	CCU Pro	CAU His	CGU Arg
CUC Leu	CCC Pro	CAC His	CGC Arg
CUA Leu	CCA Pro	CAA Gln	CGA Arg
CUG Leu	CCG Pro	CAG Gln	CGG Arg
AUU Ile	ACU Thr	AAU Asn	AGU Ser
AUC Ile	ACC Thr	AAC Asn	AGC Ser
AUA Ile	ACA Thr	AAA Lys	AGA Arg
AUG Met	ACG Thr	AAG Lys	AGG Arg
GUU Val	GCU Ala	GAU Asp	GGU Gly
GUC Val	GCC Ala	GAC Asp	GGC Gly
GUA Val	GCA Ala	GAA Glu	GGA Gly
GUG Val	GCG Ala	GAG Glu	GGG Gly